

## MIRAI MR11-05 Leg1 Photosynthetic Pigments

Last Modified: 2018-09-13

[ReadMe](#) [Observation Data](#) [Data Format](#) [Quality Information](#)

Cruise ID: [MR11-05 Leg1](#)

Photosynthetic Pigments: Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items: photosynthetic pigments

Science Keywords:

OCEANS > OCEAN CHEMISTRY > CHLOROPHYLL  
BIOSPHERE > AQUATIC ECOSYSTEMS > PLANKTON > PHYTOPLANKTON  
BIOSPHERE > ECOLOGICAL DYNAMICS > ECOSYSTEM FUNCTIONS > PHOTOSYNTHESIS

### Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR11-05\\_leg1-2\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR11-05_leg1-2_all.pdf)

### For Using Data

#### Principal Investigator

Kazuhiko Matsumoto (JAMSTEC)

#### Use Constraints

See [Terms and Conditions](#) about constrain of use.

#### Data Citation

See [Terms and Conditions](#) about data citation.

### Instrument

Instrument:

High-performance liquid chromatography (MR10-04 Leg1 - )



### Overview

Photosynthetic pigments data by HPLC during MR11-05 Leg1 cruise were obtained by the following methods. See Data List for available data at each station. Water sampling, filtration, and devices and standard materials for analysis for this method are outlined below. For further information, please see Cruise Report.

### Outline of water sampling, incubation, and analysis

- 1) Vertical sampling : Niskin
- 2) Surface sampling : Bucket
- 3) Sampling layer: : 2-13
- 4) Filter and filtration : Whatman GF/F 47mm was used at dark place.
- 5) Freezing and drying : 0 degC, 6 hours
- 6) Extract reagent : N,N-dimethylformamide (HPLC-grade)
- 7) Extract time : -20degC, 24 hours
- 8) Preservation period of frozen filter paper : a few days
- 9) Analysis place : MIRAI
- 10) Analysis device : High-performance liquid chromatography (HPLC)
- 11) Stationary phase : YMC C<sub>8</sub> column, 150×4.6mm, 35degC
- 12) Mobile phase (unit in volume ratio):  
Eluant A: methanol : acetonitrile : aqueous pyridine solution (0.25M pyridine) = 50 : 25 : 25  
Eluant B: methanol : acetonitrile : acetone= 20 : 60 : 20
- 13) Analysis pigment number : 26 pigments (see cruise report)

### About High-performance liquid chromatography (HPLC) and its utilization in MIRAI

High-performance liquid chromatography (HPLC) is a kind of column chromatography to separate, identify, and quantify individual chemical compounds from mixtures of compounds by a difference of chemical attractions with the column's stationary phase.

A high pressure to the mobile phase allows for a better resolution and sensitivity than ordinary column chromatography.

In MIRAI, HPLC are used for separating and quantifying various phytoplankton pigments in natural seawater. Taxonomic composition of phytoplankton can be estimated by measuring composition of their pigments. In this cruise, reversed phase C<sub>8</sub> Columns and pyridine are used as stationary and mobile phases, respectively, based on a method of Zapata et al. (2000). More pigments can be separated by using C<sub>8</sub> column than C<sub>18</sub> column which was conventionally used. Pyridine used as a mobile phase is suitable for a better separation of phytoplankton ingredients such as carotenoids and chlorophylls.

### Specifications of High-performance liquid chromatography

Manufacturer: Agilent Technologies, Inc.

Instruments type: Agilent1200 modular system

G1311A Quaternary pump (low-pressure mixing system)

G1329A auto-sampler

G1315D photodiode array detector

Pigment detection and identification:

Pheophorbide a, Pheophytin a : 409nm

Chlorophyllide a, Chlorophyll a : 431nm

[3,8-Divinyl]-Protochlorophyllide, Neoxanthin, Violaxanthin, Divinyl Chlorophyll a : 440nm

Chlorophyll c3, Chlorophyll b : 462nm

Others : 450nm

#### Reference material

Chlorophyll a : Sigma-Aldrich co.  
Chlorophyll b : Sigma-Aldrich co.  
Beta-carotene : Sigma-Aldrich co.  
Other 22 pigments : DHI co.  
trans- $\beta$ -Apo-8'-carotenal (Internal standard) : Sigma-Aldrich co.

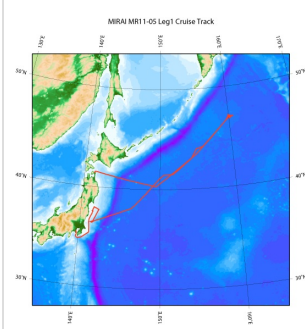
#### Reference

Zapata, M., Rodriguez, F. and Garrido, J. L. (2000), Separation of chlorophylls and carotenoids from marine phytoplankton: a new HPLC method using a reversed phase C8 column and pyridine-containing mobile phases, Mar. Ecol. Prog. Ser., 195, 29-45.

#### About this data

There are some description error for photosynthetic pigment data of this cruise.  
Please refer to the errata of the cruise report.

#### Related Information



[Enlarge Image](#)

#### MR11-05 Leg1

Ship Name: MIRAI  
Period: 2011-06-26 - 2011-07-16  
Chief Scientist: Makio Honda (JAMSTEC)  
Project Name: [Station K2, Station KNOT]  
Proposal ▶ Effects of meso-zooplankton on food web and vertical flux  
Title:

#### Update History

2018-09-13	An observation data was registered.
2013-08-20	An observation data was registered.

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#### Data

[Map Search](#)  
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#### Information of the Ships

NATSUSHIMA  
KAIYO  
YOKOSUKA  
MIRAI  
KAIREI  
CHIKYU  
KAIMEI  
SHINSEI MARU  
HAKUHO MARU

#### Information of the Submersibles

KAIKO  
SHINKAI 2000  
SHINKAI 6500  
DEEP TOW  
HYPER-DOLPHIN  
URASHIMA  
YOKOSUKA DEEP TOW  
6K Camera DEEP TOW  
6K Sonar DEEP TOW  
KM-ROV  
POWER GRAB SAMPLER (SHELL)  
POWER GRAB SAMPLER (CLOW)  
BMS

#### Go to a Cruise Information

Cruise ID:

#### Go to a Dive Information

Dive ID:

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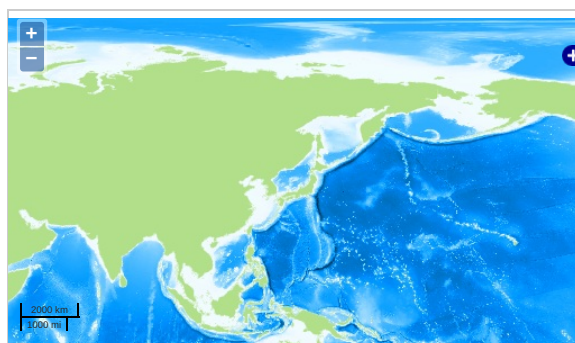
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### Observation Map



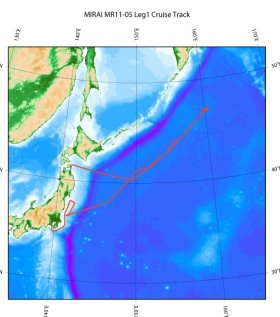
... Observation Line ... Navigation ... Observation, Dive Point, Hole

### Data List

File names

☐ MR11-05\_leg1\_HPLC.csv

### Related Information



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